REMARKS

Favorable reconsideration of this application as presently amended and in view of the following remarks is respectfully requested.

Claims 1-27 are presently active in this case. Claims 1, 4, 5, 9, 11, 12, 16, 24, and 25 have been amended by way of the present amendment.

In the outstanding Office Action, Claims 1-7, 24, and 25 were rejected under 35 U.S.C. 112, second paragraph, for being indefinite; Claim 1 was rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Publication No. 11-345780 to Kazuyoshi et al; Claims 1-4, 6-11, 14, 16, and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kazuyoshi et al in view of Japanese Publication No. 09-272965 to Michio et al; Claims 5, 12, 13, and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kazuyoshi et al in view of Michio et al and U.S. Patent No. 6,235,120 to Bang et al; and Claims 18-27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Michio et al in view of Kazuyoshi et al.

In response to the rejection of Claims 1-7, 24, and 25 under 35 U.S.C. 112, second paragraph, Claims 5 and 12 have been amended to clarify that the "soft metals" are at least one of aluminum, copper, or nickel or alloys of these metals. Claims 1, 24, and 25 have been amended to delete the reference to "JIS B 0601-1994." A copy of this reference is submitted herewith as Attachment A. Finally, with regard to the rejection of Claims 9 and 12 for reciting "low" without a basis for comparison, Applicants respectfully point out that Claim 8 from which Claims 9, 12, and 13 depend defines at least one low hardness coat which is selected from a plurality of spray deposits. Consequently, the recitation of "the low hardness coat" in Claims 9, 12, and 13 finds an antecedent basis in independent Claim 8. In view of the above, no further rejection under 35 U.S.C. 112, second paragraph, is anticipated.

Briefly recapitulating, a component of a vacuum deposition apparatus (a component body) according to the present invention (Claim 1) is characterized in that a surface roughness of the spray deposit formed on a surface of the component body is provided by a mean spacing S of tops of local peaks of a profile of surface roughness, a distance from a mean line to a bottom of profile valley line Rv, and a distance from a mean line to a top of profile peak line Rp.

For the reasons discussed below, the surface roughness of the spray deposit is provided by the mean spacing S of tops of local peak of profile, the distance from a mean line to a bottom of profile valley line Rv, and the distance from a mean line to a top of profile peak line Rp. That is, as described in paragraph [0020] of the Background of the Specification, in existing vacuum deposition apparatus, in order to stop an adhered deposition material (adhered film) from peeling off, the "the surface roughness of the spray deposit is made large." Due to the larger surface roughness of the spray deposit surface, the surface roughness of the spray is intended to increase an adhering force of the deposit material. However, when the adhered film piled up on "the spray deposit of larger surface roughness" is largely uneven on the surface of the adhered film, particles which are easy to peel off and fall off, pile up on the adhered film. Consequently, components that have the existing spray deposit have particles which fall off and result in dust. In some cases the adhered film itself peels off.

In order to address this problem, Claim 1 defines that a roughness of the spray deposit formed on the surface of the component body is provided by the mean spacing S of tops of local peaks of a profile of surface roughness, and distances from the mean line to the bottom of profile valley line Rv, and to the top of profile peak line Rp, in order that "the adhered material piled up on the spray deposit grows with stability." Namely, as described in paragraph [0044] of the Specification, in order to stop particles from falling or the adhered

film from peeling due to the large surface roughness of a spray deposit, in the present invention, a spray deposit having the surface roughness provided by S, Rv and Rp is applied.

As a consequence of using a spray deposit wherein the mean spacing S of tops of local peaks of a profile of surface roughness is in the range from 50 to 150 μm, the adhered film piled up thereon grows with a stable columnar structure, which prevents the particles from falling and the film from peeling. Furthermore, as a consequence of using a spray deposit wherein distances from the mean line to the bottom of profile valley line Rv and to the top of profile peak line Rp each are in the range from 20 to 70 μm, respectively, the adhered particles can pile up more uniformly on the spray deposit (relative to existing spray deposits). Accordingly, the particles may be stopped from falling.

When the distances from the mean line to the bottom of profile valley line Rv and to the top of profile peak line Rp each exceed 70 μm, the adhered particles pile up without uniformity. Hence, the particles fall from the adhered film. Furthermore, a difference in height of the piling shape of the adhered film occurs. The adhesion of the particles piled up at a higher portion are lowered which results in falling particles. The distance from the mean line to the bottom of profile valley line Rv and to the top of profile peak line Rp each should be 20 μm or more because the adhesion of the adhered film becomes lower when the distances from the mean line to the bottom of profile valley line Rv and to the top of profile peak line Rp are too small.

The distances from the mean line to the bottom of profile valley line Rv and to the top of profile peak line Rp show, as described in paragraph [0043] of the Specification, distances from the mean line of a curve of surface roughness to the bottom of the profile valley Rvi and to the top of the profile peak Rpi. Namely, they show the maximum values of the bottoms and tops of the profile of the surface roughness.

Kazuyoshi et al. (JP 11-345780) disclose a vacuum deposition apparatus having a "member which constitutes the interior of a reaction container" (member) of which surface roughness is provided by "ten-point means roughness Rz" and "a mean interval S of local ridges." As shown in paragraph [0016] and Fig. 4 of Kazuyoshi et al., "ten-point means roughness Rz" is the average of the distance of the summit of the mountain and the distance of the bottom of a thread. Applicants respectfully submit that Kazuyoshi et al.'s average is patentably distinct from the distance feature of the present invention.

According to Kazuyoshi et al., as described in paragraphs [0008] and [0018], "the peeling of a member is prevented by enlarging the roughness of a front surface of the member as much as possible and extending the touch area of a member and a deposition film." It is described in Kazuyoshi et al. that enlarging Rz as much as possible improves membranous adhesion.

Applicants submit that enlarging the front surface roughness of the member, as described in Kazuyoshi et al., causes the deposition condition of sputtering particles to be unstable. Consequently, the present invention provides that the distances from the mean line to the bottom of profile valley line Rv and to the top of profile peak line Rp, respectively, are 70 μm or less in order to deposit sputtering particles stably and uniformly. That is, the apparatus and method disclosed in Kazuyoshi et al. is patentably distinct from the present invention in that it fails to disclose or suggest the preventive techniques (features) of the present invention.

In this regard, it is also apparent that the present invention and Kazuyoshi et al. differ in the "diameter of particles to be prevented." In the present invention, as described in paragraph [0095] of the specification, whether a part is good or bad is determined by "the number of the particles of which diameter is 0.2 μm or more." On the other hand, as shown in Table 6 of Kazuyoshi et al., whether a part is good or bad is determined by "the number of

spherical salients with a diameter of 5 μm or more." Applicants respectfully submit that this shows that the technique of Kazuyoshi et al. is patentably distinct from the preventive technique of the present invention.

Thus, applicants respectfully submit that Kazuyoshi et al. do not disclose or suggest a spray deposit having the roughness surface provided by the mean spacing S of tops of local peaks of a profile of surface roughness and distances from the mean line to the bottom of profile valley line Rv, and to the top of profile peak line Rp. Further, the roughness surface of the member in Kazuyoshi et al. is patentably distinct from that of the spray deposit according to the present invention. Moreover, Kazuyoshi et al. do not show the preventive technique provided by the present invention. That is, Kazuyoshi et al. do not disclose nor suggest the subject matter defined by Claim 1 of the present invention.

Michio et al. (JP 09-272965) merely disclose a part including a spray deposit wherein its surface roughness is provided by average-of-roughness Ra. Bang et al. (U.S. Pat. 6,235,120) merely show a part comprising a multilayer structure. Neither Michio et al. or Bang et al. disclose a part comprising a spray deposit having roughness surface provided by the mean spacing S of tops of local peaks of a profile of surface roughness, and distances from the mean line to the bottom of profile valley line Rv, and to the top of profile peak line Rp. Hence, it is believed that Kazuyoshi et al. fail to disclose or suggest the subject matter defined by Claim 1 when considered alone or in combination with Michio et al. and Bang et al. Claims 2-7 are believed to be allowable for at least the same reasons as Claim 1.

A component of a vacuum deposition apparatus defined by Claim 8 of the present invention includes "a low hardness spray deposit" as a part of the spray deposit formed on the surface of the component body. The low hardness spray deposit is at least one low hardness coat selected from the following group: an Al base spray deposit of which Vickers hardness is Hv 30 or less, a Cu base spray deposit of which Vickers hardness is Hv 100 or

less, a Ni base spray deposit of which Vickers hardness is Hv 200 or less, a Ti base spray deposit of which Vickers hardness is Hv 300 or less, a Mo base spray deposit of which Vickers hardness is Hv 300 or less and a W base spray deposit of which Vickers hardness is Hv 500 or less.

The low hardness spray deposit is not obtained by merely spraying metal. As described in paragraph [0059] of the Specification, the low hardness spray deposit can be only obtained by implementing annealing after the spraying. Then, in the low hardness (softened) spray deposit, destruction from the inside of the spray deposit may be suppressed, since the internal stress (residual stress) is relieved. Furthermore, by making the spray deposit lower in hardness, the internal stress of the material adhered thereon may also be relieved. As a result, the adhered material on the spray deposit and thereon may be suppressed from peeling. The feature of Claim 8 is based on making the spray deposit lower in hardness.

Applicants respectfully submit that Kazuyoshi et al. and Michio et al. do not specify a hardness of the spray deposit. Further, implementing annealing after the spraying is not described or suggested in Kazuyoshi et al. or Michio et al. Consequently, it is believed that the spray deposits formed in Kazuyoshi et al. and Michio et al. have higher Vickers hardness than that provided in Claim 8 of the present invention. Kazuyoshi et al. and Michio et al. do not disclose or suggest a technique for suppressing particles based on low hardness in the spray deposit. Further, Bang et al. do not disclose a low hardness spray deposit.

That is, it is not believed that Kazuyoshi et al., Michio et al., or Bang et al. disclose or suggest the features defined by Claim 8. Additionally, Claims 9 to 17 are believed to be allowable for at least the same reasons that Claim 8 is believed to be allowable.

The vacuum deposition apparatus defined by Claims 18 to 23 and the target apparatus defined by Claims 24 to 27 include, inter alia, the same features defined by Claims 1 and 8. Hence, Claims 18 to 23 and 24 to 27 are also believed to be allowable.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectively submitted,

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IN THE CLAIMS

Please amend claims 1, 4, 5, 9, 11 12, 16, 24, and 25.

1. (Amended) A component of a vacuum deposition apparatus, comprising:

a component body; and

a spray deposit coated on a surface of the component body and having surface roughness in which a mean spacing S of tops of local peak of profile [, and distances] is in a range from 50 to 150 μm, a distance from a mean line to a bottom of profile valley line Rv is in a range from 20 to 70 μm, and a distance from a mean line to a top of profile peak line Rp [, all of which are stipulated by JIS B 0601-1994, are] is in [the ranges from 50 to 150 μm,] a range from 20 to 70 μm [and range from 20 to 70 μm, respectively].

4. (Amended) The component as set forth in claim 1:

wherein the spray deposit comprises [a coat] coats of two or more layers of different materials.

5. (Amended) The component as set forth in claim 4:

wherein the spray deposit comprises a stress relief layer formed on the component body and comprising [soft metal,] at least one of Al, Cu, or Ni or alloys of Al, Cu, or Ni, and a thermal expansion relief layer formed on the stress relief layer and comprising metal of which thermal expansion coefficient is different by 10×10^{-6}/K or less from that of a material deposited by the vacuum deposition apparatus.

9. (Amended) The component as set forth in claim 8:

wherein [the spray deposit comprises] the low hardness coat is a thermal expansion relief layer comprising metal of which thermal expansion coefficient is different by 15 x 10^{-6}/K or less from that of a material deposited by the vacuum deposition apparatus [, the thermal expansion relief layer being formed of the low hardness coat].

11. (Amended) The component as set forth in claim 8:

wherein the spray deposit comprises [a coat] coats of two or more layers of different materials, at lease one layer thereof comprising the low hardness coat.

12. (Amended) The component as set forth in claim 8:

wherein the spray deposit comprises a stress relief layer formed on the component body and comprising [soft metal,] at least one of Al, Cu, or Ni or alloys of Al, Cu, or Ni, and a thermal expansion relief layer formed on the stress relief layer and comprising metal of which thermal expansion coefficient is different by 15 x 10^{-6}/K or less from that of a material deposited by the vacuum deposition apparatus, at least one of the stress relief layer and the thermal expansion relief layer comprising the low hardness coat.

16. (Amended) The component as set forth in claim 8:

wherein surface roughness of the outermost surface of the spray deposit is in [the] a range from 5 to 15 μm in terms of an arithmetical mean roughness Ra [provided by JIS B 0601-1994].

24. (Amended) A target apparatus, comprising:

a target body; and

a spray deposit coated on a non-erosion area of the target body and having surface roughness in which a mean spacing S of tops of local peak of profile [, distances] is in a range from 50 to 150 μm, a distance from a mean line to a bottom of profile valley line Rv is in a range from 20 to 70 μm, and a distance from a mean line to a top of profile peak line Rp [, all

of which are provided by JIS B 0601-1994, are] is in [the ranges from 50 to 150 μm, from 20 to 70 μm and] a range from 20 to 70 μm[, respectively].

25. (Amended) A target apparatus, comprising:

a target; and

a backing plate comprising a backing plate body holding the target, and a spray deposit coated on a surface of the backing plate body and having surface roughness in which a mean spacing S of tops of local peak of profile [, and distances] is in a range from 50 to 150 μm, a distance from a mean line to a bottom of profile valley line Rv is in a range from 20 to 70 μm, and a distance from a mean line to a top of profile peak line Rp [, all of which are provided by JIS B 0601-1994, are] is in [the ranges from 50 to 150 μm,] a range from 20 to 70 μm [and from 20 to 70 μm, respectively].